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| APPLICATION NO.   | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|-------------|----------------------|---------------------|------------------|
| 09/998,993  | 11/15/2001  | Michael Turner       | M-12396 US          | 9456             |
| 22434   | 7590        | 05/03/2005           | EXAMINER            |                  |
| BEYER WEAVER & THOMAS LLP<br>P.O. BOX 70250<br>OAKLAND, CA 94612-0250 |             |                      | MALDONADO, JULIO J  |                  |
|   |             |                      | ART UNIT            | PAPER NUMBER     |
|   |             |                      | 2823                |                  |

DATE MAILED: 05/03/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

**Application No.**

09/998,993

**Applicant(s)**

TURNER ET AL.

**Examiner**

Julio J. Maldonado

**Art Unit**

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 17 February 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-25 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-25 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: \_\_\_\_\_

**DETAILED ACTION**

1. The rejection as set forth in Office Action 12/01/2004 is withdrawn in view of Applicants amendments filed on 02/17/2005.
2. Claims 1-25 are pending in the Application.

***Allowable Subject Matter***

3. The indicated allowability of claims 4, 5 and 11-25 is withdrawn in view of the newly discovered reference(s) to Phatak et al. (U.S. 6,852,649 B1). Rejections based on the newly cited reference(s) follow.

***Claim Rejections - 35 USC § 102***

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. Claims 1-8, 10-18 and 20-25 are rejected under 35 U.S.C. 102(e) as being anticipated by Phatak et al. (U.S. 6,852,649 B1).

Phatak et al. (Figs. 1, 5, 6-8) teach a method for depositing a substantially uniform doped silicon oxide layer (702) including the steps of providing a substrate (700) in a deposition chamber; preheating said substrate (700); introducing a phosphine gas having a first gas flow rate and a silane gas having a second gas flow rate into a plasma within a deposition chamber, wherein a ratio of the phosphine gas flow rate to

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the silane gas flow rate has an initial value; measuring the temperature within the deposition chamber; performing step changes or linear changes in the ratio of the phosphine gas flow rate to the silane gas flow rate as a function of the temperature from an initial deposition period to a final deposition period within the deposition chamber, wherein said changes can either increase or decrease said ratio as a response to changes on said measured temperature; maintaining said ratio of said final deposition period constant in order to form said silicon oxide (702) with uniform dopant concentration; and forming etching one or more contact holes (704) through the doped silicon oxide layer (702), wherein the one or more contact holes (704) have straight sidewalls (column 4, line 5 – column 7, line 22).

Phatak et al. fail to expressly teach determining a duration of the initial period by measuring a temperature of the wafer during a test deposition of a doped silicon oxide layer, wherein the duration is the time required for the temperature to reach an essentially constant value; measuring a concentration of dopant incorporated into a portion of a silicon dioxide layer as a function for a first series of test depositions performed at a constant temperature, repeating the measurement of dopant concentration for a second series of test depositions performed at a different constant temperature and measuring a temperature profile of the wafer during a third test deposition wherein the temperature is not held constant, whereby the initial value of the ratio is determined.

However, Phatak et al. disclose the dopant concentration in the source gases achieve a constant dopant concentration in the layer (see Fig.5, for example). It is

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believed that the series of experiments to measure the time at which the temperature reaches a constant value and to set an initial value of the ratio of the phosphine and the silane gas would be necessarily performed in Phatak to produce such data.

***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 9 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Phatak et al. (U.S. 6,852,649 B1) as applied to claims 1-8, 10-18 and 20-25 above, and further in view of the following comments.

Phatak et al. substantially teach all aspects of the invention but fail to disclose wherein the preheat temperature is 350°C, the initial value of the ratio is about 0.49 and the final value is about 0.77. However, the selection of the selection of the temperature and initial and final ratios is obvious because it is a matter of determining optimum process condition by routine experimentation with a limited number of species to obtain a doped oxide layer with a desired doped concentration. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the above-mentioned temperatures and ratios to arrive at the claimed invention.

***Response to Arguments***

8. Applicant's arguments with respect to claims 1-25 have been considered but are moot in view of the new ground(s) of rejection.

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***Conclusion***


9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to examiner Julio J. Maldonado whose telephone number is (571) 272-1864. The examiner can normally be reached on Monday through Friday.

10. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Olik Chaudhuri, can be reached on (571) 272-1855. The fax number for this group is 703-872-9306 for before final submissions, 703-872-9306 for after final submissions and the customer service number for group 2800 is (703) 306-3329.

Updates can be found at <http://www.uspto.gov/web/info/2800.htm>.

Julio J. Maldonado  
Patent Examiner  
Art Unit 2823

Julio J. Maldonado  
April 27, 2005

  
George Fourson  
Primary Examiner